Department of Environmental Quality (DEQ) and

The Dow Chemical Company (Dow)

TRI-CITIES DIOXIN COMMUNITY MEETING

August 9, 2006

6:30 - 9:00 p.m.

Horizons Center, 6200 State Street, Saginaw

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MR. CHUCK NELSON: I would call your attention to the agenda that's been distributed to you. What I would especially call your attention to is you look at the front first. You'll note that we have an extremely full meeting agenda tonight, a lot of presentations. We have opportunities for questions after each kind of set of presentations.

I would especially ask that you stick to one question in your time at the microphone so everyone who has a question can get their first and foremost question answered. Now when we get near the end of the meeting, you'll notice that we have a question and discussion time from 8:15 on. That will provide a considerable window to do some things that are a bit more in depth.

Some of you are new to the process, new to the meetings. I want to encourage you to stay afterwards if you can and spend some time with folks from the DEQ, Department of Community Health, Dow, all the folks that are here to help you get yourself up to speed, because it's a little challenging to ask a basic question like, well, what happened the last year, when most the folks here were here for the last year. We want to move forward. We've got a lot of

good, new information, but I want to keep everything in the process.

I would also, if you look at the back of the agenda now, it has the community meeting ground rules. These rules are very basic. They ask for your respect. That everyone here is important, and everyone here deserves the opportunity to be reasonably heard and to ask their questions and get an answer. We'll do our absolute best to give everybody a fair shake.

What I would also note for you on number ten is you will see websites where you can get very in-depth information, find out very detailed facts, and go look for stuff if you're curious, and especially if you want to kind of catch up what's been the chronology of the time line. I think these folks have done a pretty good job of putting this information together, but there's a lot of it, and in a two-minute question and answer kind of period, I'm sure we can't answer all your questions, so be sure that you avail yourself of this opportunity.

I want to thank you all for coming. My name is Chuck Nelson, by the way, I'm the facilitator, and in my day job, I work for Michigan State University in the Department of Community, Agriculture, Recreation

and Resource Studies.

Now to get things going tonight, I'd like to have folks from the Department of Environmental Quality introduce the folks they have here and then to have them also introduce other people from the State perhaps, and then we'll have folks from Dow introduce the folks that they have here. So, Jim, do you want to start.

MR. JIM SYGO: For those of you who don't recognize me, I'm Jim Sygo. I'm Deputy Director with the Department of Environmental Quality, and if I could ask the Department of Environmental Quality staff to stand, we'll quickly try to point them out to you.

In the front row here, we have Steve Buda, who's the Section Chief for the Hazardous Waste Program; George Bruchmann is the Division Chief for Waste and Hazardous Materials Division; Al Taylor is a geologist we couldn't live without down there; Deb MacKenzie-Taylor is our toxicologist in the Hazardous Waste Program; Terry Walkington is our District Supervisor in our Saginaw/Bay office; Art Ostaszewski is again with the Hazardous Waste Program, does a lot of the work on our computers and assists us in those areas as well; Cheryl Howe is in the back of the room

and assisting there; Frank Ruswick is also in the back of the room here, Frank is the Assistant to the Director -- Senior Policy Assistant to the Director, and I think that's all of them.

Now if you sit down, if we could have Michigan Department of Community Health staff. In the front row, we have Linda Dykema. Linda, you're the Section Chief, is that right?

MS. LINDA DYKEMA: Manager.

MR. JIM SYGO: For Epidemiology and --

MS. LINDA DYKEMA: Toxicology and Response.

MR. JIM SYGO: We have Brendan Boyle who also works at the Michigan Department of Community Health, and Kory Groetsch. Kory will have presentation a little bit later on our findings in the Fish survey that was conducted by the Department of Community Health.

MR. JOHN MUSSER: Good evening, everyone. Thanks for turning out. Just to get on with some of the trading of people here, we had a change in our leadership for the issue -- the dioxin issue. You may have seen Susan Carrington has been reassigned, has been appointed to another role within the corporation. Taking over her role with respect to managing this issue, I've got a new boss, and his name is Greg

Cochran.

Greg comes to us from Texas, is a former Union Carbide employee, and came across to the Dow organization when that acquisition took place, and comes to us with a lot of experience in b environmental health and safety, in manufacturing, and in dealing with these kinds of issues on other fronts. He's got a family. He's got two children, one in college, and the other -- both are in college, moving to Saginaw?

MR. GREG COCHRAN: Correct.

MR. JOHN MUSSER: Will be commuting from Saginaw, all the way from Saginaw. Thank you, Greg. In addition, I'm just going down the line here. I'll introduce you to the folks, just let them know who you are when I give them their name. This is Denise Kay from ENTRIX, Environmental Toxicology and Risk Assessment; Tom Long from the Sapphire Group, Risk Assessment and Toxicology; Lisa Aylward from the Summit Group, Toxicologist; Bob Budinsky, Dow Chemical Toxicologist and Risk Assessment; Kent Woodburn from our Environmental Tox Group; Bryce Landenberger, Chronic Risk Assessment; Mike Carson our Regional Medical Director; Jim Collins our Director for Epidemiology; and Dr. Priscilla Denny is our

Remediation Assistant Program Manager; Peter Simon, ATS, they're doing the GeoMorph remediation investigation; and also Brian Eggers is here from AKT Peerless and team. That's it from our end. Thank you.

MR. CHUCK NELSON: One other thing Cheryl asked me to note is that the slides on the fish consumption survey are now available in the back of the room. They came a little late. So Cheryl has a copy of that power point if you'd like that. So be sure to pick that up and also brochures, is that correct?

MS. CHERYL HOWE: Yes.

MR. CHUCK NELSON: Okay. Let's start out then with the upper Tittabawassee River floodplain, GeoMorph status update.

MR. PETER SIMON: Good evening. My name is Peter Simon. I'm with the Ann Arbor Technical Services. I'm the Project Manager for the GeoMorph investigation for the upper Tittabawassee -- actually, the Tittabawassee River project. Tonight's objectives are generally to recap -- I don't know how many of you were here in May when we did an overview of the GeoMorph process and the proposed schedule for the investigation, but I'm going to generally just briefly

recap what that process is for those that were not here. In addition, I'm going to review the study areas for the Tittabawassee River. We've broken it out based on logistics and ability to get things completed this year, and then review where the GeoMorph project status is as of today.

What is GeoMorph? Well, GeoMorph, it's an information rich process. You can think of it as trying to understand river's landscapes. The river evolves over time, and it's about erosion and deposition and trying to understand where materials are deposited, where they erode is an important and fundamental element of the GeoMorph process.

One of the purposes and goals generally is to identify like sediment areas. The river behaves in a certain systematic way. There are definitely things like modifications or changes to the river. Somebody comes in and installs a bridge, that has an effect on the overall flow characteristics or how the river moves through that system, and that's an important thing to try and understand. These are just some kind of foundational elements of the GeoMorph program.

For the purposes of 2006, again, we started this endeavor on -- beginning of April or actually March 31st of this year, looking at the resource

availability and the 22 miles of the Tittabawassee River. We broke it down into what we refer to or what I refer to as the upper 6 miles. For those not knowing exactly where that starts, we started at the confluence of the Chippewa and Tittabawassee River and proceed downstream through the Dow plant area, past Gordonville Road Bridge, past Smith's Crossing Bridge, and just about a mile north of where Highway 47 would intersect the Tittabawassee River.

The project involves about 6 and a half miles. One of the foundation elements of the GeoMorph program is to divide the river into unique flow reaches. We call them reaches. In the upper 6 and a half miles, we've identified 15 specific flow reaches, substantial flow characteristic changes in the river. We for reference purposes have identified those on this print lettering them A through O.

Many of these -- many of the efforts that we've undertaken on the upper 6 we've also extended down to the lower 16, and it's not something I want to get into today, but there's roughly 15 reaches in the upper 6 and I think there's something like 45 or 50 reaches that we've identified in the lower 16. So it gives you some understanding of the general complexity of the Tittabawassee River.

There are many things that we look at, and for those of you that were here in May, we talked about the layer concept. One of the layers that we use to help us understand the river landscape are looking at historical changes. I don't know how well you can see on this figure, but what you have here is a 2004 aerial photograph. Down the center of the river is our station. That's how we refer to everything. It's based on a 50-foot interval. You also can see potentially, there's a purple line and a black line, that basically outline the river. The purple line is the river channel based on 1937. The 2004 is identified in black.

So you can see there is some change in this area. For your reference, the bridge at the top of Reach M is the Smith's Crossing Bridge. So there has been a little bit of movement through this river -- or this reach. Areas upstream and downstream have different elements or different degrees of change, but this generally is one of the elements that we look at.

We also look at the land use characteristics. Areas in brown are identified differently than areas in green. We have agricultural areas. We have industrial areas. The river is identified in blue. There's erosion areas identified in yellow, and again,

this is one of the elements looking at the topography, the land use, the changes in the river characteristics. Again, the goal and the purpose here is to try and understand in as many separate layers as we possibly can the river landscape, how has this river behaved for the period of interest that we're interested in. We don't want to go back 1,000 years. We don't want to go back 500 years. There's a finite period of time that we're interested in.

One of the other elements that we look at is actually the GeoMorphic features. Here you can see, these are all color coded. There's tan, green, light green. These are different features. Some of them are low terraces, high terraces, intermediate terraces and so forth, levies, natural levies. Each of these will have different deposition and erosion characteristics based on different river conditions, whether it be base flow, whether it be an 8-year flood, 100-year flood, 25-year flood. Each of these features will behave differently, and the stability of these features will be different based on the individual flood characteristics.

The lateral areas across here, across each of these features, we have -- these are sampling locations, and these are sampling locations

specifically for Reach M. In total, there's about 640 sampling locations that we've identified right now in the upper 6 and a half miles. Now these are locations. That isn't to say or equate that or equal that to the number of samples. Each of these locations we're looking at the vertical development of the soils in these areas. So in many of these sampling locations, we may have two samples, we may have six or eight samples, depending on how complex that surface is or how complex that surface has evolved.

We started developing the sampling and analysis plan beginning of April, and in the May presentation, we talked about a collaborative process between ATS, MDEQ, Dow and U.S. EPA, and we've been very successful in doing that. Everyone that has been on the team has worked really, really hard to get to where we are at today.

Just to give you some idea of the milestones that we've been able to accomplish over the last 60 to 90 days, we have developed successfully a sampling and analysis plan. It has been submitted. It has been reviewed, and ultimately, we've gotten regulatory approval on that in July. That's quite amazing given the compressed time frame.

In addition to that, one of the fundamental elements of the GeoMorph investigation is a rapid turn analysis of the dioxin and furans. One of the complexities historically for dioxin investigation is the analyses are very extensive and it takes a long time to get the data back. Well, we started on the road of developing a validated method, not a screening procedure, but using -- if 1613, which is the preferred method for dioxin high resolution aspect, dioxin and furan analysis, using that as a core and then optimizing it based on the special aspects of this particular project. We received approval to use that methodology also in July of this year.

The status summary, so where are we at today. The upper Tittabawassee River sampling and analysis plan was submitted in the beginning of June. Approval was granted on that sampling and analysis plan after several working sessions, collaborative working sessions, all day working sessions in Lansing with key DEQ staff, Dow staff, U.S. EPA staff, and ATS staff. Issues that came up that we needed to resolve, we put a task force together to resolve those and put timelines, milestones and accountability to achieve those in the time frame that we had allowed.

Bottom line, July 31st, last week ago Monday, we

commenced a sampling on the upper 6 miles of the Tittabawassee River. Currently, the program for the sampling, we are working 10 days on and 4 days off, so we refer to those on the GeoMorph team as stages. We've successfully completed the first stage, the first 10-day stage this afternoon at 5:00. The team is headed home to see their families after working the last 10 days consecutively to start on that 600 samples and -- 600 sampling locations and 2,500 samples.

The first stage of the sampling program was a calibration stage. There's a lot of new things that we're pulling together. So we are running at about 25 to 30 percent of what our anticipated full capacity of the project will ultimately be. To date, we've got somewhere around 150 samples that are currently in process. When I say in process, that's collected, cataloged, logged, and many of the data are being entered -- the samples are being analyzed right now, and we should be receiving results over the coming days, and there will be a plan to pull that information, analyze it and distribute it to a larger audience.

Looking back at the overall schedule that we had proposed in May, there's many items in here. To date,

the top several items are gone. We've accomplished those in the time frame from May to present day. What currently is on the docket is to complete the sampling and analysis, or the site characterization, for the upper 6 miles by the end of October. We have a great field program. We have a great team. We've got great support entities, and everyone that's been working on the team has really stepped up to make sure that we accomplish this.

In addition to that, December 31st, we are still on schedule to complete the foundation layers for the balance of the Tittabawassee River, the remaining 16 miles. That involves a variety of things that include the GeoMorphic characterization of the river, looking at the surfaces, and so on and so forth. We're still on schedule to have that completed by the end of December.

Where ultimately do we want to go in the upper 6-mile characterization, well, that would be a site characterization report that will be submitted to the agencies on February 1st. So we're on schedule. A lot of the commitments that we laid out and presented in May we've accomplished, and we continue to move forward on this project.

MR. CHUCK NELSON: Very good. We'll do

questions at the end of this segment, because I want to make sure we keep moving. Thank you. Jim, who do you have to do the GeoMorph review and approval. Is that Al?

MR. JIM SYGO: Right.

MR. AL TAYLOR: Good evening. My name is Al Taylor. I work with the Michigan Department of Environmental Quality in the Waste and Hazardous Materials Division, and I was one of the people working with Peter and with Phil, the Simon boys as we call them, on the GeoMorph process. What I would like to do tonight is go through a little bit of where we are in the overall response to the RIWPs, give you a little background on that, very briefly touch on GeoMorph, because Peter has already done an excellent job in talking about that, and tell you about some of the other issues that we're working through and what those timelines are.

So I'm just going to go ahead and get started. Just for background, in December of last year, Dow submitted a remedial investigation workplan for the Tittabawassee River and Midland areas of concern. It's no secret that DEQ and EPA did not like these plans. They found them to be substantially deficient. Dow and EPA and MDEQ reached agreement on prioritizing

work for this year in order to get sampling accomplished this year, rather than go through another round of NODs and paper. We figured out a way to get out in the field and start collecting data while we worked through some of the more difficult issues.

What that entailed was we agreed to do some things by this summer, principally focused around data collection, this field season, and we deferred responses on some of the more difficult, in particular human health risk assessment issues, until twelve -- or December of this year.

I'm going to update you on GeoMorph a little bit more -- I'm going to go very briefly through that -- some of the scheduling issues that we're dealing with and where we're trying to go with those, collection of key exposure assessment data during 2006, talk a little bit about the bioavailability study for the Tittabawassee River and the bioavailability studies and other contaminant study for the City of Midland.

The GeoMorph sampling plan, I'm going to blow through this pretty quickly. Basically, Dow's main proposal to use GeoMorph to do characterization of floodplain sediments and soils was fundamentally different than what had been proposed in December of last year. It was we believe a much more

comprehensive approach that we could conceptually get behind.

These are all things I believe that Peter has discussed. The thing I want to hit on here is we believe that the GeoMorph process with the near realtime analysis for dioxins and furans provides opportunities for interim responses or opportunities to get out on a pilot basis at this point, start doing some things in the river to prevent releases of -- or re-releases of contaminated sediment to the river. We're looking at this as an opportunity not only to prove the remedial investigation part of this but also to start getting a handle on what we can do to start reducing exposure. Obviously, this GeoMorph is all about determining the patterns of contaminant distribution, so the investigation can be more complete and efficient, and we can integrate what we're seeing out in the field with Dow's release history.

Peter went through most of these items. I want to note that Dow and ATS and DEQ and EPA are continuing to work through some significant technical issues. Probably one of the more challenging things that we're working on and making good progress on is coming up with the list of contaminants, other than

dioxins and furans, that we need to be looking for in the river. That's pretty challenging when you consider that we have essentially a 100-year-old chemical plant site that's manufactured a very broad range of compounds and chemicals and used by-products and waste products.

Field work for the GeoMorph process is ongoing now, anticipated to be completed in October, and the data is going to be provided to DEQ and EPA on a routine basis for review. That way, Dow, ATS and DEQ and EPA can get together and make course corrections as necessary. If we find data that's not making sense, the patterns aren't making sense, we can collectively say, we need more information in this feature or we need to understand this better, we need more information here, or maybe we need less information.

With respect to the list of contaminants that we haven't agreed on yet, we've arrived on a methodology whereby we're archiving the samples and freezing them essentially, so we can go back and re-analyze them, so we don't have to go back out in the field hopefully and resample. Of those samples with short holding times, meaning you have to analyze them in a very short period of time, we've reached agreement on

those, and we think that the process, as Peter laid out, is actually a pretty good model for future work and to make progress on this. So we kind of got modest success here and we want to capitalize on it.

With respect to scheduling issues, the Department's expectation, and Dow has confirmed that they are going to do this, is a fully revised -- or a fully revised remedial investigation workplan by December 1st of 2006. Collectively, Dow and the DEQ, and I believe Greg is going to jump up and correct me if I'm wrong, we believe that the schedule can be compressed significantly over what is seen in the December of 2005 proposed scheduling and the May 1st proposal.

An example of where we think we can do that is related to the exposure data collection survey. There's a proposal for an 18-month survey. We think that maybe we can use some existing data, maybe some of the data that's going to be coming out that was collected as part of the U of M dioxin exposure study and some of the MDCH fish information that Kory is going to talk about a little bit later, to help compress that timeline.

Something that is very important to us is we want to get all the key activities integrated into a single

schedule so we know how everything is moving together. This is a very complicated -- or actually, a very couple of complicated projects, and it's important that we understand what's moving in parallel and what key points are. A couple of things that we've noticed in our review of the schedule is that things like ecological risk assessment work isn't integrated into the schedule, at least as of May 1st. I know that's going to be fixed, and the Department believes that we need to have a development of sediment criteria. I'm not sure if Dow is in full agreement on that yet, but those are things under the corrective action process that we're looking at getting integrated into the schedule. So it's very clear what's going to happen when and what information we need in order to proceed forward.

As part of the May 1st response to the Department -- in a response to the Department's Notice of Deficiencies, the Department pointed out that we wanted to see some key exposure assessment data collected in 2006. Dow is not necessarily in agreement with this, and we're continuing to work toward resolution of these issues.

Things that we think deserve a pretty high priority this year yet are Priority 1 and Priority 2

property sampling. Those are the properties that have flooded on a relatively recent basis from the seven to ten year flood. It's where people are living, and we think that's where we should be focusing at least some of our data collection in the near term.

Agricultural property sampling, mainly to find out -- blowing dust has been represented to us as being an issue for people with property next to some of the big agricultural fields. We want to find out how big a concern that is or is not, and we think we need to take advantage of the existing field seasons to do that.

Kory is going to talk a little bit more about fish, but there's some fish data that we probably need to be collecting both probably on the Tittabawassee River and the Saginaw River to fill some data gaps there. As part of this process, MDEQ, EPA and Dow have agreed to review the U of M DES results, which I understand are going out next week, and see what information that provides and then we'll be meeting in early September to determine how we're going to move forward with this.

The bioavailability study for the Tittabawassee, very recently, I think as of last Friday, a decision was made whereby Dow has been reviewing this issue,

along with DEQ and EPA, and collaboratively has decided that it's really not necessary or appropriate right now to proceed with further bioavailability work on the Tittabawassee River floodplain. That's probably another opportunity to compress that schedule.

For Midland, there's bioavailability study PCOI work. PCOI means potential constituents of interest, or contaminants other than dioxins and furans in this case. For Midland, Dow's revised workplan, I believe we received the final revisions to it on schedule on Monday of this week, and it was sent to the scientific peer review panel on the same day. It's going to be under review this month by TERA, which is an organization out of Cincinnati, has done scientific peer review for the Department before and also for Dow Chemical before.

Peer review is going to be ongoing over the period of this next month, and final DEQ approval plan will be based on the results of the peer review, which is expected in early September. Right now, the plan, assuming the peer review goes okay and we don't have any major problems identified, soil sampling for dioxin and furans is to be conducted in Midland during the late fall of this year, September and October of

2006.

As part of this workplan, they're going to be evaluating other potential contaminants. It's not going to be full or exhaustive evaluation of these other potential contaminants, other than dioxin and furan, but it's going to be a fairly arms length evaluation, and the RIWP, remedial investigation workplan, which is coming in December, will have a better addressment with that issue, and that's it.

MR. CHUCK NELSON: So update on interim response activities, John.

DR. PRISCILLA DENNY: Good evening. I'm Dr. Priscilla Denny, and as John mentioned to you, I'm one of his Managers of the interim response activities. This slider states that these are ongoing interim response activities, and for those of you who are new to this, what that means is that this has been going on actually last year, April of last year.

We have two categories of properties that you probably heard about, Priority 1 and Priority 2, and that's based upon the March 2004 flood event. There were some properties that had more significant flooding than other properties, and so based upon that, there were two categories, Priority 1 obviously being ones that were most affected and Priority 2

those being less affected, I guess you could say.

Some of the properties had a little bit of border on that, and those are the ones I'll be talking about this evening. I'll also be addressing some issues just to clarify for people who may be interested in the audience the differences between the interim response activities, what's going on, the people that you might be seeing out on residential properties along the river, as opposed to what Peter Simon from ATS had presented, and that is in regards to the remedial investigation work that might be going on.

Just to recap, the Priority 2 process actually began this year in March. We had packages, letters essentially mailed out to residents, those select residents that are Priority 2 properties along the river, again those people who had some water on their property based upon the March 2004 flood. These folks essentially were sent, and some of you might be in the audience, were sent basically invitations to participate in the Priority 2 mitigation options, and the purpose of those options is to -- and Al has spoken to this before -- is to reduce exposure, and these interim response measures are just that, interim until there is something that is agreed upon as a final solution or a final remedy to the issue.

Part of that package were also license agreements. Those license agreements actually gave AKT Peerless, who is in the audience, permission, as well as other Dow subcontractors, to come onto your property and to actually conduct a home visit and find out what appropriate measures could be taken to reduce exposure, and finally -- or I should say, the third bullet notes that we've actually scheduled some of those property visits, and we've also made calls, or best efforts is what we call them, for folks who have not contacted us.

So here we are. We're in the implementation phase of the Priority 2s. Right now as we speak, we have AKT Peerless out in the field and doing a very good job, as far as I'm concerned, identifying what those interim response activities should be as for the property, and when they're there, what they do is they issue vouchers, and they issue vouchers for activities that can range from anywhere from cleaning your house, cleaning any dust out of your house, cleaning your air ducts, all the way to perhaps even moving a vegetable garden or putting top soil on a vegetable or a flower garden that might be used that might be in the flooded area.

And just as a point, you might ask yourself,

well, how do you know which area was flooded. We referred back to aerial photographs actually that were taken during the week of the peak flooding in March of 2004, and Dow and DEQ sat down, actually it was last year, in January, and we essentially went down the river end. We were able to determine which ones were the Priority 1 and Priority 2 properties based upon those aerial photos.

So after we've issued the vouchers, essentially, the Priority 2 residents actually are then responsible for contacting select vendors that have been approved for this type of work, and after they collect -- after they've contacted the vendors, the vendors then go out, perform the work, and they perform the work that's only been identified on the voucher.

I mentioned to you the differences. Just so that, you know, to clear up any confusion that might come up, AKT Peerless is actually not on the property to do any sampling this year. I know this is something that was a bought of contention that we were talking about before, but they are there to do ongoing response -- interim response activities for this year. Those response activities are designed to provide soil exposure barriers, and as I mentioned before, it goes all the way from going inside the home, deciding if

you have to have your air ducts cleaned, you know, if the property owner wishes, to maybe even moving a vegetable garden.

ATS, on the other hand, may be on Priority 2 or Priority 1 properties to sample, but that at this time has not been determined. However, what you'll see is you'll probably see a crew, if you see them at all, and they'll be out, and that's part of the site characterization process that Peter Simon had mentioned before. So it's vastly different what the purpose is for what AKT Peerless is out there to do, conduct the home visits, find out what can be done on the property on site to reduce exposure, versus the site characterization process.

So finally, the home visits, they're underway. We have received to date -- or I should say, as of July the 31st, there are a total of 533 properties that are actually eligible under Priority 2 definition, and to date, license agreements that were returned were 260, and those folks represent people who want to be, what we call, quote, unquote, "participants", in Priority 2 mitigation options process.

Of those 260 folks, we have actually issued 92 vouchers to people. That means that we've been able

to set up a home visit. We've been able to go to the home. We've been able to identify the appropriate mitigation options for that particular parcel, and we've issued the voucher, meaning given the voucher to the resident. Now it's up to the resident to decide. So there's 92 people who are in the Priority 2 affected areas that currently have vouchers, and just to point out to you the difference between the 260 and the 92, well, what happened to the other people. Well, we're still -- it's still ongoing. So there are new appointments every single day. You might drive up and down the river, and you might see -- you might see AKT Peerless out there meeting with folks. You might even see some of the folks that do landscaping out there from our select vendors.

And finally, we have to date, or as of July 31st, 13 mitigation options that were completed on properties, and so what a blessing. A point I really want to make is, if there are residents in the audience, we really encourage you to either, A, send in your license agreements or, B, just, you know, call your vendors and turn in your vouchers so that we can move ahead with the interim response activities, but I'd like to take a moment and just thank everybody, if you're a resident, for participating, if you have, and

also thank AKT Peerless for being in the field, and lastly, I think this is the portion where we have questions.

MR. CHUCK NELSON: So we have an opportunity to ask questions about any of those presentations you've seen so far. So if you have a question, please, go to the rear microphone, and we'll let the people respond to you here, and I'll be at the middle one.

AUDIENCE MEMBER: I have a question. It's in regards to your interim response to reduce exposure. What happens if you move my vegetable garden and you move my flower and then next year 2006 we have a flood again and all that area that you just have done a remedial response has now been flooded and contaminated again? What then do I expect from you?

DR. PRISCILLA DENNY: Thank you very much for your question. Actually, that gives me a great opportunity to note that there are flood response activities that are available to those residents in the Priority 1 and Priority 2 categories. If you're in either one of those categories, what you can do is, if you have been flooded, please, contact AKT Peerless, and you can get together with them after the meeting, should you have a need to get their contact

information, and what they do is they schedule a home visit, just similar to the initial Priority 1 visit. They come out. They document. They take pictures. They find out if there has been something that's disturbed that was actually a mitigation option.

For example, if we moved your vegetable garden and it was flooded and we come back after the flood and we see that it's been flooded again, we discuss options with you. Maybe it wasn't moved up far enough or maybe we need to move it. Usually, there is some options available, or you can add top soil. So there's some options available to interim response activities that have already been conducted on your property. We will come back and repair those. Thank you for your question.

MR. CHUCK NELSON: Any further questions?

AUDIENCE MEMBER: Four months ago when we heard the presentation by the GeoMorph people, I believe it was stated that the advantage of doing that approach was that you could actually do remediation in realtime when the sampling was being done, but it sounds like we're going to get a report in February. We're not going to see any removal. We're not going to see any effort at cleanup, at least I haven't heard that yet. Is that accurate?

MR. JIM SYGO: It's not anticipated that you're going to see any removals immediately this summer immediately after the sampling or likely this fall, but the hope would be that -- as we come into the spring, that one of the things that you saw that Al had mentioned that we still need to develop is some sort of criteria, and as we develop that through this fall, as we get into next spring, the opportunity would be there to do that type of work. Now I'm going to throw it over to Peter as well to see if he agrees or disagrees that that's the perspective that the Department has on it.

MR. PETER SIMON: Absolutely, we agree. I mean, we're about nature and extent. We have to identify where the materials are, and based on that, there's a variety of factors that need to be brought into play in order to address those. At such time that you have that decision making process defined, which it's not right now for this project, you then can absolutely bring corrective actions into place. If remediation is one of them, that can be done. There may be other ways to handle it. So you have to define the problem before you can go and fix it.

AUDIENCE MEMBER: Well, isn't it correct -- I mean, it was very artful last time. It seemed to me

you made a presentation that suggested that when sampling was being done it was an opportunity, and that in the past, some of the activities that you had been involved in, in past jobs, in fact, that's what occurred.

MR. PETER SIMON: That is, in fact, what occurred. Part of the process allows you to define the extent of the contamination on a near realtime basis. So once you define your decision making process, you can do that. We haven't defined that for the Tittabawassee River project. It takes some time.

AUDIENCE MEMBER: Okay. This is getting very frustrating. It's five years now. Come on, folks. What is the hold up? Are we talking about a conflict around at what levels we're going to see removal? Is this -- John, is this the problem again, the State and DEQ is having, the State and Dow have not decided on whether they're going to remove that background or some arbitrary dioxin number?

MR. JIM SYGO: Well, again, I think we've got to determine what that number is based on our evaluations. Terry, you have to understand, we don't have a lot of information at all relative to the analytical work that's out there. We need to take a look at that to try and evaluate where the impacts

are, and I think where the State is headed is we'd like to take an approach that would use the ecological risks that's associated with the Tittabawassee River floodplain in particular to take actions that would be consistent with, you know, improving and addressing the ecological concerns as well. We're in the process of working on that, but you're right, we haven't gotten that fully completed yet. I know our staff has looked at that. We've got some numbers in mind, but we just haven't gotten there yet, because a lot of people have been busy putting the sampling plan together for this summer.

AUDIENCE MEMBER: So these folks run across 7,000, 8,000, 12,000 parts per trillion of sampling, they leave it there until a report is issued, and then start back again next summer when the dynamics of the system may change?

MR. JIM SYGO: We would work with them for next spring so that that could start, but again, as we get that identified and as we move down the Tittabawassee, the hope is that it will be more realtime oriented, so that we have that information. In the situation of the floodplain, there may be specific areas that need to be discussed. It may not be every area where you have a certain concentration,

but it's probably likely the first pass on this is going to be associated with where we have major erosional zones, so that we're not contributing more to the river.

If we start dredging the river and we haven't dealt with the erosional zones, you're just going to have more materials coming into the river, so it doesn't make any sense to dredge the river now and then have another flood come up and have it deposited back into the river from the floodplain. It just doesn't make any sense, and we need to understand the floodplain dynamics before we can say it's time to start dredging.

So those are -- it's easy to say, pick a number and start dredging, but why would you do that if next year you get another flood and the erosional areas from the river are going to contribute back to the sediments of the Tittabawassee River.

AUDIENCE MEMBER: That's what I'm saying, if you do nothing after the sampling results, is that system going to look the same -- the first 6 miles going to look the same next summer?

MR. JIM SYGO: We'll still be able to do realtime analysis to do verifications whether those materials are there, and I think generally again

that's going to depend on the dynamics of the river. If we have another 120-year flood this spring, you're right, it probably won't look the same, but if it doesn't look the same, that's when ATS and the State will have to utilize their judgment to do some additional sampling to the sediments in the river to identify where those areas are, but we still need to deal first with the floodplain erosional zones, because if you don't deal with that, you're in the same boat, Terry. You're going to recontaminate the river from those sediments that are coming in from the floodplain.

MR. CHUCK NELSON: Terry, we've got one other question behind you.

AUDIENCE MEMBER: I don't understand the logic of it.

MR. JIM SYGO: Terry, let's get together a little later.

AUDIENCE MEMBER: Stay right there, because this follows up on what he said. He said summer. You said spring. This has got to be done in winter or summer. You don't do this in spring and fall when it's raining, right, Terry?

AUDIENCE MEMBER: Right.

MR. JIM SYGO: I said we'd be ready for

dredging in the spring, that's what we think, and identifying areas of the erosional zone.

MR. CHUCK NELSON: Okay. Let's move on to the presentations regarding fish, both in terms of fish consumption and fish advisory. John, do you have one more thing to add?

MR. JOHN MUSSER: I just wanted to make one comment that, you know, there are other options, other remedial options, besides dredging. That may be a viable option. It may not be. There could be other methods used to deal with situational areas. So I hope you keep that in mind.

MR. CHUCK NELSON: Kory.

MR. KORY GROETSCH: There's a new brochure that's out in the back. If you haven't got it, it has a handy little ruler. Go pick one up. It's at least fun to see the ruler.

Up to this point, everything you've heard is from a regulatory sort of prospective. So I'm from the Health Department. We don't have regulatory input into this process. We show up with advisories, information, which we hope people can use to make an informed choice. So tonight I'm going to be talking about communication of the fish and wildgame consumption, about some recent work we've been doing

in this area.

I would first just recognize and acknowledge and thank, actually, how we do this. We've had some funding from a local nonprofit foundation called the Saginaw Bay Watershed Initiative Network and from the U.S. Environmental Protection Agency, two separate funding sources. We had student interns helping us out from SVSU and Delta College and a local coordinator who was very instrumental in helping me, and the stakeholders committee, and the stakeholders committee has been very willing to help and provide their time. I thank them greatly, and they've really improved the process. I mean, they've come up with some really good ideas, and we've tried to implement them.

Fish consumption advisories and wildgame consumption advisories are a bit different than the typical chemical exposure advisory that the Health Department might give. If you think about certain advisories the Health Department might give is they're out there saying, look, cigarette smoking is bad, okay. It's a negative, you know. There's no benefit to cigarette smoking, but when it comes to fish consumption advisories, fish, without the chemical contamination, is a wholly healthy food, and there's

lots of scientific data published talking about the health benefits of fish consumption.

And so when we're out there telling people about the fish consumption advisory, we really need what I would call a balanced method. We need to sort of bring two sides together. What I've sort of found is there seemed to be some polarization around this process. You either have folks who are maybe overly sensitive or concerned about the potential risks and say, I don't want one single molecule of that in my body, or they may sort of go to the other side and think these are completely innocuous, and neither is true. Both need to come to the middle and realize that there are these benefits from fish consumption. If you choose the right fish from the right location and process them in the right way, you're better off.

So our goal was to promote healthy choices of fish and wildgame consumption in the Saginaw Bay Watershed. So this has to do with more than just the Tittabawassee River. Some of our survey data has to do with the Tittabawassee River, and so I was asked to sort of share some of that with you tonight as well, but I wanted to give you kind of the big picture.

When we go out there and give an advisory program, you have to realize that it's a science based

process. It's all data driven. You have to have good data from the fish and wildgame before you tell anybody. So if we don't have data on a particular species or from a particular place, we're not going to be able to provide you information. Once you have that data, we can do a risk evaluation of it, what the potential health risks will be, and then we have to do the communication process, and it's this third point that I'm going to focus on tonight.

This is the way I breakdown the communication process with basically four points. First, you have to think about fish and wildgame, who are you trying to talk to, who is going to be eating these fish and wildgame and who's the most sensitive, and that's what that list basically makes up. Once you have that list, you want to understand something about their consumption patterns, because that's going to fall into the risk evaluation, as well as sort of what the local culture is and how they're going about -- because you don't want to deliver a message that's really detrimental. If people are going to be dependent upon a particular fish and you come in and say, don't eat it, they're not going to pay attention to it. So you have to formulate the message in a way they're going to follow it. So you have to develop

and package that message and finally distribute it. In this pilot project I'm talking about tonight, we've not done them completely. We have not -- there's not going to be a whole completed process. We've sort of gone through every step and tried to make a good shot at each of them.

So how do we start. Well, we started out with talking to local healthcare providers, one of the thoughts there, nurses and folks who provide information, possible communication staff, WIC claim folks, local Health Departments, thinking that these folks are going to be in contact most with women of childbearing age, the most sensitive population, and young children under the age of 15; of course, hunting and fishing leaders, people who are the heads of the various, you know, hunting organizations around here, and there are many, and then finally an urban community group, specifically the City of Saginaw we've been working with, and that was really the focus of the EPA Grant, looking for these sort of urban sustenance fishers and how to communicate with them.

So then we went on -- basically, there were two simultaneous activities going on. The first we had going, first, we wanted to identify fishing consumption patterns. We thought, well, let's focus

on fish because we'll get a good crosscut of that list of folks we're trying to communicate with, whether it be to figure out what sort of racial background we're dealing with, men versus women, what are some of these patterns of consumption, and then finally we'll talk briefly about the message that we pulled together, and I just say that we came out with the message by viewing materials from across the U.S. There are many fish advisories done across the U.S., and so we reviewed those, and we had a focus group with local Health Departments and others, getting together and trying to flush that out.

So let's talk about that fish consumption survey. There are really two objectives, and I'm focusing on the first, and that is determining the fish consumption patterns of people fishing these water bodies. The methods, just to touch briefly on those -- the second point is we also asked questions about the -- we asked about the fish consumption advisory. We don't have enough time to go through all of these, the size and scope of this display by itself. We'll focus on number one.

The method of this was, we did streamside surveys. So we had folks going out along the river and talking to people holding fishing poles, people

fishing along the rivers. The benefit of this is you're getting to, you know, folks who are going to be likely -- most likely be eating the fish. You know, they're out there taking the time to catch the fish. We had to keep the survey rather short. It was 24 questions. They could have them -- we could complete a survey in about 10 to 15 minutes, and then these four points were generally the four points covered in the survey.

So some stats numbers as far as how many surveys did we do, how many people did we talk about and complete surveys with. We had a total of 1,088 individuals, fishers, people fishing these rivers. By water body, you can see the breakdown, Saginaw Bay 182 individuals and so on.

If you take that 1,088, for data analysis purposes, I break them into three groups. The first group are people who said, they do not eat fish from Michigan waters. This is an important point. So we're not -- we didn't collect any of the data on these folks because we're not really interested in them from the standpoint of fish advisories. They're not being exposed to fish consumption. This is a critical point. In that, if you're not engaging in a behavior that's going to lead to your exposure, then

we don't have a problem, okay. Keep that in mind through when you ask any pathway exposure, that's a critical point.

Group two then, these are people who do eat fish from Michigan waters. However, 272 of these respondents did not eat fish from the water body they were fishing on at the time. So they could be sitting there on the Saginaw River fishing and we walked up and said -- 272 said, no, we don't eat fish from this water body. We're out there recreational fishing, and the third say, do you eat fish from Michigan waters, and they said, yes, we do, and we also eat them from the water body we are fishing on.

If you look at the samples then again, sample size again, you say, okay, how does it breakdown by group then. If you had your total survey numbers, in group two, those saying they eat fish from Michigan waters, 170 individuals from the Saginaw Bay and so on, and then group three would be how many actually eat fish from that water body, and if you take the group three numbers and would divide them either by the total survey, so 163 divided by 182, or 163 divided by 170, and 170 might be a little more accurate from the standpoint that these are people who eat fish from Michigan waters, other folks may just

not like to eat fish, you can come up with percentages.

And I think what it shows you -- one basic thing is, if you see somebody fishing the Saginaw Bay, you see them out in the boat with a fishing pole, I'll bet you that they're going to eat their fish. 96 percent, 99 percent of the people, they're out there with a pole catching fishing, they're taking them home, they're eating them. There's a lot of fish consumption obviously going on in this area.

What about race. What is the sort of -- this is one of the pictures we were coming up with. Who do we run into fishing these rivers. Largely, we came across white men. That was a large percentage. I would say -- I don't have the gender up here, but it was probably, oh, about 90 percent male. The second largest group was black African American. I think we got a good cross representation of them in the study, and then from there, sort of a variety of other folks, and the quotation marks are sort of self defined, okay, so this is what we asked, how would you define yourself, and they said, this is how we would define ourselves.

Well, what sort of species were these folks eating from these rivers. There are slides with

individual species. I've sort of grouped them together for this discussion, and on the vertical axis, the Y axis, the part that says 0 to 100 percent, that is the number of respondents reporting one of these groups, and so at Saginaw Bay, it would be the 163 individuals, the percentage of 163. The first bar, the gray bar, represents people who said, I only eat walleye, say, from the Saginaw Bay. That was about 23 percent or so. I only eat walleye. I don't eat any other species. Second bar, second bar says, well, I eat walleye and perch or only perch.

These first two groups you could add together. It's the only two bars you can add together, but if you add those two bars together, it comes up to around 70 percent, and they represent fish that are low in contamination or lowest in contamination at least in these water bodies and ones that the Health Department that says, yes, you can eat on a regular basis. Now women and children have more restricted fish consumption advice than adult males.

But here's the good news. I mean, too often people are picking up on only the most negative parts of fish advisories, and we're really trying to provide that balanced message, and if you think about it, what it says in the fish advisory, it says, walleye under

22 inches is unlimited consumption for adult males and women beyond childbearing age. That's good news and something a lot of people don't realize. Pick up the fish advisory, you will find a lot of good news in that document.

So the third bar then now represents other species. Now this is where you're going to get into your bass, your white bass, a number of species that are quite contaminated, or can be, and we have much more stringent advisories on them, and then really the most concerning to me is, when you see this yellow bar, at least for the Saginaw Bay, Saginaw River and Tittabawassee River, where we have lots of stringent advisories, these are the bottom feeders, the carp and the catfish. The Health Department says, don't eat these fish. They are very, very, very, very contaminated, and we find a large amount of consumption of these fish in the Saginaw River. Over 20 percent of the fishers are eating those carp and catfish. That concerns me, and that's where you'll see in a minute here we're putting a good deal of our efforts because of this sort of data we're collecting.

And I guess I would also point out that green bar in the Saginaw River you see a very diverse of fishery, also the same on the Tittabawassee River.

There are a large number of folks who are eating a diverse species, diverse species fish selection, and these again are consumption of these fish. It's not just harvest, but they take them home. They're saying they're eating them.

Well, as you saw, we have race information. You could break this out by, let's say, minority group versus the white group, white males largely, and I think this one shows also a rather stark difference in selection. Again, you could add that those first two bars together, the gray bar and the white speckled bar for the white group, you would get around 70 percent of the folks are eating the cleanest and least contaminated fish, least amount of concern I'm going to have, but if you look at the minority group, my goodness, only about 10 percent are selecting those species. They are heavily selecting -- over 60 percent are selecting bottom feeders and over like 90 percent are selecting other species of fish away from walleye and perch.

What this tells me from a communication standpoint is this is a group we have to talk to, but we have to understand them first so we can formulate a message that they're going to be willing to accept, because right now, we really don't -- I don't

understand why they're choosing these fish, what are the cultural backgrounds that drives them to want to eat the carp and the catfish. There's something they like about it, okay, which is very different from the other group. More work to be done.

Let's switch over to the message. There's going to be a lot more data. A report will be coming out, and it's going to be very, very long, but there are -- there will be lots of information like this that we can draw on. So as I said, we've formed a focus group and sort of come up with topics for our message. One of them really is this Michigan consumption advisory which is a science driven document. We need the data to be able to give the advice. Right now, for instance, our wildgame advisory is very generic. It's very broad, and says, you know, well, be aware of almost any game species in the floodplain. Now the more data we get, the more we're going to be able to refine that and be very specific, which is going to open up more consumption opportunities. We'll be able to say, okay, don't worry about species A, B, C, really focus on not eating that turkey, which we already know, but there may be other species out there like that.

We'd like to get folks really sort of reinvested

in fishing, you know, I mean, come out and take a new look at the Saginaw River, Tittabawassee River. If you're overly concerned, really been sort of scared away because of this contaminant issue, it's not that bad. I mean, it's not as bad as you might think it is. There's a lot of fishing that can be done. It's always safe to catch and release, and there are fish you can eat from even those rivers, like the walleye. It's part of a healthy diet. We're the Health Department.

How to avoid these chemical pollutions that's found in some of these fish. So what's important is you can't just type up a black and white piece of paper and stick it on a post and say, we've posted the fish advisory, we've done our job. That's not enough. You have to make it user friendly. You have to make it acceptable to that audience so they can -- are willing to take it and actually implement it in their lives.

When you look in this document, and this one here is the one that has the good fish is I would say in it from the Saginaw Bay watershed, there are a lots of fish that are safe to eat, even for pregnant women and young children. For some folks, that's a revelation, and then finally, for those waters with this long

lasting chemical contamination, such as the Tittabawassee River, we do need to make these documents so they're clear about which ones are unsafe. For instance, don't eat the carp, the catfish, or the white bass from anywhere in the Tittabawassee River, but hey, there are safe fish out there that you can eat, as long as you follow fish consumption advisory for walleye and perch, for instance, and there are others, and I'll show you the sign in a moment.

So these are the brochures, pick them up in the back. The first one there is the one that points out -- it's more for your hunters and fishers. If you're trying to find a good place to fish, that's been tested and low in chemical contamination, you can take them home and feed these fish to your kids without concern, this is the document for you. The second one is just some general information about cooking and cleaning and sort of an overview of this fish consumption advisory issue, and the third one really comes -- is based on the U.S. Food and Drug Administration. There's one chemical -- I'll ask you one question, what about grocery store fish. Well, the U.S. FDA says, there is one chemical that you need to be concerned about. It is mercury. We've taken

their information, and you will find a guide, a listing of those species, and some advice on how frequently you can eat them, even if you are a pregnant women or a young child.

So we've engaged in some activities in the City of Saginaw where we've run into the largest sort of this, quote, unquote, "minority population", and we've been running some events titled Fish Smart Eat Smart. This is a title come up that was developed by the First Ward Community Center, our partner in Saginaw, and these events I think are quite positive, in a sense that we get people out there, and the very first picture in the upper righthand corner is a picture of folks learning how to make their own inexpensive spinner baits, so they can catch more walleye and predator fish, and stay away, stay away from those bottom feeding fish. Remember the slide, bottom feeding fish, lots of folks are eating those. We want them going after the walleye. So we're showing them, hey, you can make a cheap spinner bait and you can go use it.

How do you use it. Well, we brought our pro bass fisherman and he was talking about how to use those spinner baits. We had the Bay City State Park there to help you identify those fish. You have to be able

to identify the fish to be able to use the fish advisory, and we had some pictures of -- there was a fairly good turnout. We had hundreds of folks at each of these events, and our little display of handing out materials.

This was not paid for by any of our grants. This is through the regulatory process through -- between Dow and DEQ, but I helped make the sign. I had a big hand in making it. I'll take some of the credit at least, give a lot of credit to Al. Making the sign was easy. Getting them in, that's effort, but you'll see on there both the do not eat message, stay away from the carp, catfish and white bass, but you'll also see that positive message if you look at the walleye. Everyone else, unlimited consumption under 22 inches. One meal a week over 22 inches. If you're talking women of childbearing age and kids, well, it's much more restricted, as I said, one meal a month under 22 inches and 6 meals per year over 22 inches, and then you have your advice on some other species, as well as inches.

One of the neat things, so these signs went in towards the end of our survey process, and at the end of our survey, which lasted two months, we were able to find 13 individuals who first learned of the fish

advisory from these signs streamside. I think that's pretty good.

So let's summarize and finish up here. So a communication process, going for that balanced message, we want to have an ordered message. We want to come up with the healthy benefits and fun of fishing. So take a new look at the Saginaw River and Tittabawassee River but then use it safely. That's the way to get the message out in my opinion.

The initial results, well, we found a lot of people are eating fish from these waters. There are a good number of people who are eating fish we would advise against, and that racial differences do seem to exist -- they do exist in these Michigan consumption patterns, something that needs further exploration and future work needed, and we really need a better understanding of racial and cultural differences when it comes to these fish consumption selections, and we have some idea about the African American community, but I do not want to forget the Hispanic community or the migrant worker community that also seems to exist; although, I know very, very little about them, and work into that, and finally, I just point out that we need much more wildlife and game consumption pattern information and data, and with that, I will stop and

answer some questions, if we have time.

MR. CHUCK NELSON: Is there a question for Kory?

AUDIENCE MEMBER: Kory, you had mentioned that you might have slides for consumption on a species specific basis.

MR. KORY GROETSCH: Yes. Do you want to see some of those?

AUDIENCE MEMBER: I'm interested in seeing data on preferred or consumed fish, not only species specific but also water body specific.

MR. KORY GROETSCH: Here we go, water body specific. The first two bars -- and it's all shorthand at the top, so I'll go through this quickly in the shortest amount of time. The first two what you're going to see is the walleye and perch. Those are always the big bars. Now I'm going to take you to the next slide, and we're going to zoom in. So let's start zooming in and get rid of those two big bars and we'll zoom in to all the other colored bars, and I'll go across. It's small mouth bass is the first one and you have large mouth bass, northern pike, white bass, crappy, trout, salmon, bluegill, smelt, rock bass, catfish, carp, and fresh water drum, also sometimes known as sheep's head.

Now what I think what I would take away from this is there's a fairly extensive small and large mouth bass fishery out there going on. The Tittabawassee, it looks like 15 percent of the folks are targeting small mouth bass to eat. I was surprised by the fresh water drum consumption on the Saginaw River. We have no data on those. They are a bottom feeding fish that I think would be very fatty. I don't know what they look like with regards to the chemical contamination.

AUDIENCE MEMBER: But definitely, primarily, walleye and perch would you say?

MR. KORY GROETSCH: Yes. Like I said, about 70 percent of the folks are targeting walleye and perch exclusively, and so you're left with another maybe 30 percent that are eating a diversity of species, to which we'll need to take a closer look at.

MR. CHUCK NELSON: Thank you, Kory. I appreciate it. There will be other opportunities to ask Kory questions, so you'll get a chance. I'd like to move on if we could. So Deb, are you ready to go?

MS. DEB MacKENZIE-TAYLOR: I'm going to get started. I just wanted to let you know there are a couple other powerpoint presentations, there are a couple of handouts -- I'll get to the microphone so you can hear me. My name is Deb MacKenzie-Taylor, and

I'm with the Michigan Department of Environmental Quality, Waste and Hazardous Materials Division.

I wanted to let you know that if you are not good at listening to things there is written stuff that you can read. This is the public summary from the National Academy of Sciences. It was on the back table. So if you would prefer to read that or would like to read it later, it's there. The other thing is there's some information on toxic equivalency factors that's also on the back table, and in that, I have some example soil and sediment concentrations that show what the old concentrations were with the '98 in Midland, even what the toxic equivalency factors that were from '89 that we used when we presented data from the '96 sampling, and it shows how the concentrations have changed with the changes in the toxic equivalency factors. So I'll give you more information on what those means in a few minutes.

So I'm here to talk first a little bit about the release that occurred a couple of weeks from the National Academy of Sciences. That committee that was reviewing EPA's dioxin reassessment document, which is evaluating exposure in human health effects from dioxin and dioxin-like compounds. So what they reviewed was EPA's 2003 draft, and this document has

been going through drafts for over 15 years now, and this was the latest draft that they reviewed. It's been peer reviewed many times, and we are anxious for it to be released so that we can use it.

The National Academy of Science Committee focused on one part of this document. This document is over 3,600 pages, and they focused on the summary of the information in the risk characterization. The review they conducted was requested by EPA. They asked them to look at the scientific robustness of the reassessment document and the estimates that they had come up with for cancer risks specifically and to look at their uncertainty analysis, and that's what they focused on.

So what is the NRC report or NAS report. It is a critical review of EPA's assessment. It provides guidance to EPA on how to final their document, to improve the scientific robustness, and make it more clear to everyone so that people can use it for managing risks from dioxins and other dioxin-like chemicals, like PCBs. What the report is not. It's not a risk assessment, and it doesn't give us exposure levels that we can use for regulatory consideration. So we'll have to wait for EPA to get this back.

Some of the major findings from the NAS Committee

was they were split on whether TCDD met EPA's definition of carcinogenic to humans. Some of them thought the weight of evidence in humans wasn't strong enough. That it wasn't real strong. They did unanimously agree that dioxins and dioxin-like compounds are at least likely to be carcinogenic to humans, both TCDD and other dioxin-like compounds, and they felt that it wasn't important for them to make a decision on whether it met the carcinogenic to humans because the public health implications of that decision didn't really matter. The two terms, we regulate them the same way. So it wasn't important for them to make that determination.

Some other findings they had was in how you estimate risks at low doses. Now keep in mind, most of the time when we're looking at exposures from environmental sources, the doses are lower than what we would see from animal data, or if we have human data, it's normally occupational exposure, and exposures are normally higher. So we have to take that data and try to estimate what kind of risks there are at lower exposures. So what they were looking at was how to estimate these risks at lower exposures.

And the way EPA does it for cancer is they assume that the risk would be linear, which means they take

the doses that we see in the animal data or the human data where we see the effects, and assume it can go down to a zero, zero, and that it would be straight that way, assuming that the probability of a chemical molecule causing cancer can be one -- could possibly cause cancer. So what the Committee decided was the data that's available for carcinogenicity indicates that it may not be linear. It's more likely nonlinear, based on the information available right now on dioxins cancer risk, but it's not scientifically possible to exclude that it could be a linear response. So they're recommending that EPA provide risk assessments using both approaches.

What's this mean? Scientists like graphs, so I had to get a graph in here, and this was in the NAS report and the public summary as well, and what it means is, if you look at this curve where the top of that box is down at the bottom corner, most of the time the data I'm talking about is above the top of that box. Yet, what we're trying to estimate is down in that box or lower down in that box. So we need to figure out how to go from the data we have down to what we think people are exposed to from environmental exposures. So it's whether -- linear is that dotted line that goes down there. So as you can see, at a

low dose, you still have some response, and what they're saying the data available right now appears to be what we call subtle area, which means that little curve that goes down, and if you look there, if you have a dose -- the same kind of dose, you might have little or no response as compared to the linear approach. So although they haven't done the calculations to look at both the sublinear approach and the linear approach and compare them, it's likely that the cancer risk estimates would be less if we use a sublinear approach that they're recommending that EPA include in their reassessment.

What are some other things that they evaluated. They did look at the toxic equivalency factor methodology that we have used, and they did say that it was a reasonable scientifically justifiable and widely accepted method to estimate relative dioxin toxicity. One of the things that the NAS Committee focused on was uncertainty and variability, and what do I mean by uncertainty and variability. Well, variability, we're all different. We all have different exposures and different responses to chemicals. Like, we may all have aches and pains at times, and some of us will take aspirin or Ibuprofen or Tylenol, and it will -- the variability is what

works well for you and how much you need to take, and that can vary from day-to-day, from pain to pain, and from person to person. So that's what we're talking about variability.

Now uncertainty, now you may have a pain that you take Tylenol and it doesn't work. You didn't know if it was going to work or not for that pain but you took it anyway. That's the uncertainty. What we normally have uncertainty for risk assessment is looking at differences from animals to humans. There's a lot of uncertainty there. We don't know whether the animals are more or less sensitive than humans. So we have to -- we have uncertainty in that.

So one of the things that they wanted better representation by EPA in their reassessment is how much variability and uncertainty there is in these estimates, both in the risk estimates, in the variability. The toxic equivalency factors are variable. You have different effects in different species that they've looked at, and there can be a fairly wide range of relative potencies that those toxic equivalency factors are based on, and what a toxic equivalency factor is, is we have -- you've heard about the different kinds, dioxin cogeners and furan cogeners, and we compare how toxic they are to

TCED, which is the most toxic of the dioxin cogeners, and that relative potency from one to another is what that toxic equivalency factor is, and you multiply the cogener concentration by the toxic equivalency factor, and then because they are acting through the same mechanism, their toxicity is additive. If you have a little bit of one and a little bit of the other, it adds up to a total toxicity, so kind of a one plus one equals two in this. So they want to know what the uncertainty and variability in the toxic equivalency factors are.

And then the other thing is that the toxic equivalency factors are based on intake values. Most of these are they feed animals something with dioxin, most of the time it's feed, some sort of diet, and then they evaluate what the relative amount that they gave them that caused the effect and use that. We're looking at environmental samples and now starting to look at human body levels, as we'll get from the blood data from the U of M study that Dr. Garabrant is going to talk about, and there are some caution that needs to be used in applying the TEF, in at least recognizing that they're based on intake values and they may not be perfect for evaluating both environmental samples and human body levels. I'll

talk a little bit more about that when we get into the WHO-TEF document.

The Committee's key findings, as I said, they talked about the dose response and the risk estimates, and they want EPA to justify the approaches that they're using for dose response models, both for cancer and noncancer risk assessment. They want them to be more transparent and clear on what data they're using, what studies they're using, and why they used the data, and they also want them to be more clear, as I've said about, in identifying the uncertainty and variability, and where they can, doing it quantitatively.

Four key endpoints that they said that need quantitative risk estimates are cancer, immunotoxicity, reproductive effects, and developmental effects, and as I said before, their focus was also on quantifying the variability and uncertainty, and one of the ways that they said that EPA could incorporate this uncertainty and variability is using probabilistic models where they could to represent the range of risk estimates.

Some other key findings, that EPA should evaluate different response levels from toxicity data. This is pretty technical. They used something called an

effective dose 01, which is only 1 percent of the population. They looked at the response in that 1 percent having that response, and they wanted to look at different response levels at 5 percent and 10 percent and see how much that affects their risk estimates. They did say that the body burden was the preferred way of measuring toxicity -- in comparing toxicity. They do want EPA to adjust for differences in body fat between humans and the rodent species that they have used, and they also encouraged that EPA develop some noncancer benchmark tox values. They only had a cancer value in the reassessment, and they are recommending that the State provide noncancerous ones. Probably, if they give risk estimates for cancer based on the sublinear approach we talked about before, the noncancer may become more important.

Now I'm going to switch gears and talk a little bit about the World Health Organization toxic equivalency factors. There have been toxic equivalency factors -- I've seen four sets since I've been working on this project, and they're changing over time as more data comes in. As you get more information, you reevaluate, and the past two reevaluations have been done by a consensus group through the World Health Organization, and these are

scientists from around the world that are experts on dioxin toxicity, and this most recent one was an expert panel that met in June of last year, and then they didn't publish the results of that meeting until early July, was it, Tom, that it came out. I think it was July 7th or something like that, and what they did was they reevaluated the TEFs for dioxin-like compounds, which include the dioxin, furans, and PCBs. As I said before, the TEFs are used to estimate the relative toxicity of dioxin-like compounds into a single value called a toxic equivalency, and then they add them together to figure out what the total toxic equivalency is or TEQ.

When they did this reevaluation, they only reevaluated the TEF. There are also some fish and avian ones that they did not look at, at this time. One of the things that they decided to do was to change the TEF scale, and most of this data is on a log scale, and their TEF scale was border magnitude, half order magnitude, estimates of relative potency, and instead of using an arithmetic difference of going from like 1 to .5 to .1 to .05, they -- a log scale of half magnitude is like .33 -- or is it .3? So they went to .3, .1, .03. Another thing was that they reevaluated some of the new data that is in the

database now, including a new NTP study, and this new data has again confirmed that additivity is occurring with these different dioxin-like compounds. That when you look at the toxicity of an individual chemical and compare it to a mixture, that you get that additive response I talked about.

What are the dioxin and furan TEFs that are changed, which is what are important for the Tittabawassee River, the Octodioxin and Octofuran change and then two of the Pentafurans, and those Pentafurans are pretty important for the Tittabawassee River floodplain contamination, and the 4 Pentafuran, the 2,3,4,7,8,1, is probably about 50 percent -- or was about 50 percent of the TEQ. So those are the samples that we've seen in the Tittabawassee River floodplain before this change.

The document here also talked about application of the TEFs. Again, we talked about the dietary intake. They also were concerned about direct application of the TEF and TEQ approach to soils and sediments and to human body levels, and they really want to come up with more appropriate values, especially for human body levels. That's probably the next go around. What they want to make sure is that with soils and sediments there's ways we can adjust

for that, such as differences in bioavailability. Also, for like sediments for bioaccumulation factors you can use for different cogeners, that you can account for that. They also had other considerations for future reevaluations of TEFs. They think they need to add additional chemicals. There was an additional PCB, brominated and brominated mixed with chlorinated dioxins and furans, brominated and chlorinated naphthalenes, and polybrominated biphenyls that you guys think -- or most people from Michigan are familiar with. They also in future reevaluation of TEFs are talking about using probabilistic methodology to determine TEFs and to better describe the associated levels of uncertainty, and then as I said before, for the blood and adipose tissue levels coming up with systemic TEFs.

And then I have some examples here to show you. This is how some of the concentrations are changed. If you look at the Midland samples, those are the first three, we actually have '89 TEQs that were from TEFs that were developed and International TEFs that were developed in '89, and then the values changed in '98 and again in 2005, and it doesn't appear that there's that much difference in the Midland concentrations. They don't have -- there's not that

much of the 4 Pentafuran in the Midland soil samples, but when we get to the river, the floodplain and even the Saginaw River, there seems to be more difference from the '98 to the 2005, and for detectable, you know, the elevated levels, it seems to be about a 17 to 28 percent change, decrease in concentration. When you get down to levels below 50 parts per trillion, it didn't seem to make that much of a difference, because we're not into that much contribution from the 4 Pentafuran. You're starting to get into probably either background or nondetect data, and that didn't make that much difference for those, and then in the Saginaw River and Bay, I did some of the GLNPO data, and I put that on there. You have a more extensive list, as I said, here, and hopefully, we'll be able to get that kind of information evaluated and available, if people are interested in it.

What are we going to do from here. Well, Dow plans to incorporate the recommendations of both NAS and the WHO-TEFs in their human health risk assessment workplans for the Midland and the Tittabawassee River floodplain. All of these workplans -- or critical components of the workplans will be reviewed by an independent science advisory panels, and MDEQ will continue to use the best available science in

reviewing the workplans and making regulatory decisions to protect public health, safety, welfare and the environment. If you want more information, I also included the websites where you can get the NAS report, the WHO-TEFs, which also have a link to the scientific journal article that's on this, and then where you can get the dioxin reassessment.

MR. CHUCK NELSON: Okay. Just have time for a couple of questions here, because I want to make sure we give Dr. Garabrant his opportunity and then opportunity for general. So I see three of you in line. We'll cut it off there. So fire away, sir.

AUDIENCE MEMBER: I just had one question. It was based on the last slide, Debra, that you put up where you indicated that Dow was going to use the information form the -- the recommendations from the National Academy to the EPA as they move forward.

My question is that, it's my understanding that since 2005 the EPA uses in their judgment policy defaults that are there to protect public health in cases where there persists to be uncertainty relative to science, and the NAS review commented only on the scientific aspects of the 3,600 pages of scientific information that has been developed over the last many, many years, and so I'm a little confused on what

difference that's going to actually make to the NAS recommendations to the EPA as it sets about to establish recommendations for cleanup and so forth based on policy rather than on science.

MS. DEB MacKENZIE-TAYLOR: Well, I can give you my standpoint, and I'm sure one of the many Dow toxicologist risk assessment people can give their take on it. We have a lot of work to do on exposure assessment, and I think we need to focus on that first, and that will give us some time to see what EPA is going to do with this NAS report and how they're going to respond to it. Being that we are regulating one of EPA's programs, the Resource, Recovery and Conservation Act in this corrective action, we have to look to EPA on their take on the NAS report. Hopefully, we'll get that timely for decisions that need to be made for this contamination issue, but we'll see.

MS. LISA AYLWARD: Lisa Aylward from Summit Toxicology. I followed the risk assessment issue on dioxins for decades now, and I will just say that in the NAS report, the key message in the NAS report is that there's enough science that we don't have to use the default policy assumptions that are typically used in cancer risk assessments. That there is a huge

database of science that it can be used to replace those uncertainty based default assumptions, and if you do that, you're likely to get a quite different answer in many cases. That they recommend EPA go back, have -- may take the step of overturning their defaults and using the science based approach, because there is sufficient science to do that for dioxins, where there isn't for many other chemicals, and so there is a direct recommendation in that report to not use the default policy approach that has been used in the past, to use a science based approach, and if EPA chooses to continue to retain that science based, that policy based approach, that they identify it clearly as a policy decision and not as a science decision.

AUDIENCE MEMBER: Thank you very much. That was a great answer.

MR. CHUCK NELSON: Sir.

AUDIENCE MEMBER: Bill Egerer with Midland Matters. Dr. Taylor, this question you may be able to answer it, or possibly Jim Sygo or John Musser may have to weigh in, but the specific question is, will Hormesis dose response models be used in consideration of the workplan now that NAS has called into question the dose response? And I do understand it may take EPA the better part of a year to digest the NAS

report, at least that's what they said at the conference, but Hormesis is a large emerging body of science, and since dose response is being looked at or being scrutinized more, will that be considered? And that's part of a bigger question, and that is, the merging science in general, how does it get integrated into this process of regulation?

MS. DEB MacKENZIE-TAYLOR: Well, we do look at the science that is available, and hormesis is something that has been seen for some effects with certain chemicals and maybe not all the effects. I've seen it included in stuff I've done, but not in all of the stuff -- the studies I have done. So it is something to consider, but I don't know how it's going to be incorporated into regulation at this point in time, and again, we're going to have to look to EPA on how they're going to do that.

AUDIENCE MEMBER: But your one slide said on path four that Dow plans to incorporate the recommendations, et cetera, et cetera, and then DEQ will continue to use best available science. Again, the general question is, what's pushing new emerging science to be integrated into this regulatory process?

MS. DEB MacKENZIE-TAYLOR: Well, you have to look at the science and the strengths and weaknesses

of the science, where we know what it does, and then the uncertainty, and remember, that we have to be prudent in protecting public health. So in the absence of certainty, sometimes we have to be protective, and for some of the Hormesis questions, yes, I agree there are Hormesis for some effects. I don't know if it's for all of the effects associated with dioxin or not. So we have to consider that.

AUDIENCE MEMBER: Thank you.

MR. CHUCK NELSON: Go ahead, ma'am.

AUDIENCE MEMBER: I don't understand all the science and all that stuff, but meeting after meeting, I keep coming out with the same thing. Dioxin is a health issue. The river and the floodplain are contaminated, and Dow is responsible. I just want one question answered, when are they going to clean it up so that my property values will return?

MR. JIM SYGO: I'm looking at it being more rhetorical than anything else. I think for several years now, as I've attended meetings, I have repetitively said, this is going to be a slow process. It isn't going to happen overnight. It's going to take a number of years. Examples, we've been working on the Kalamazoo since 1998. We're just in a position now where something is going to happen there. I think

we're much further ahead in this area of the state with the information that we've had to work on some of the pathways and the depositional areas that we've seen on the Kalamazoo to make this happen much faster than the typical type of corrective action that you might see in other major river systems.

We're not looking at a small plant area. You know, we're looking at, in this case for the Tittabawassee, 22 miles of river there, and we still got the Saginaw to deal with and the Saginaw Bay. So again, don't expect that this is going to happen next week, next year. It's going to take a number of years to get through the Tittabawassee and finish up the Saginaw as well, and I can't give you a specific projected date on when that's all going to come together. I can say that we're making a lot of progress, but part of this process is going to be -- as I was trying to indicate to Terry earlier, in going out to just dredge, it isn't going to do you any good to dredge, if you know that all the materials that are still contaminating the floodplain are going to get back in the river because it's eroding from the floodplain. What have you accomplished, nothing. That's why we have to look at all the data together, and that's what people have difficulty in

understanding, but without looking at how these processes work together, we're liable to go out there blind and do something and not accomplish what we're setting out to do. So it will take some time.

MR. CHUCK NELSON: Dr. Garabrant.

DR. DAVID GARABRANT: I want to spend a very brief few minutes talking about the announcement of the results of the University of Michigan Dioxin Exposure Study. My team and I will announce the results at Saginaw Valley State University next Tuesday, August 15th, at 6:00 to 8:00 p.m. This will be the first set of announcements of the results. It will present the major findings from that study. There will be subsequent technical meetings throughout the fall to explore the results in greater detail.

I'm just going to run through a list of things that we're going to talk about, each of them fairly quickly, on August 15th. We will review the study design and the process by which we arrived at a final study design. We will then identify the factors that are related to dioxins in people's blood. As some of you recall, the purpose of the study was to identify what factors explain variation in blood dioxin levels and in particular whether living on contaminated soil or having household dust contaminated with dioxins

affects the amount of dioxins in people's blood.

So we're going to identify the factors that are related to dioxins in people's blood. We will show comparisons of the blood dioxin levels between Midland, Saginaw and Jackson, Calhoun, and within the different populations of Midland, Saginaw who were in our study. Essentially, we had five populations in our study, people who live in the floodplain of the Tittabawassee, people who live in census blocks adjacent to the floodplain of the Tittabawassee, people who live in what we call the Midland plume, an area downwind of the Dow plant where we believe aerosol deposition has resulted in soil contamination people who live in other areas of Midland and Saginaw not near the rivers and not downwind of Dow, and then for comparison the population of Jackson and Calhoun Counties, about 100 miles south of here, and in no region where Dow could have any influence on the environment.

We will discuss how soil dioxin levels relate to blood dioxin levels, whether they are associated. We will discuss how household dust dioxin levels are related to blood dioxin levels. We will discuss the effect of other things, such as age, sex, body mass index, in other words, how heavy we are, smoking and

breast feeding, on blood dioxin levels. We'll talk about food consumption, particularly looking at consumption of fish from the Tittabawassee River, Saginaw River, Saginaw Bay, fish from other sport fish caught -- or I should say, other sport fish or fish bought from stores or eaten in restaurants, game consumption from the Tittabawassee and Saginaw River areas, game consumption from other areas in Michigan, meat, dairy and eggs, vegetable consumption, recreational activities in the floodplain of the Tittabawassee and Saginaw Rivers.

We will then talk about the measured levels of dioxins in soils that we've made. So now I've left behind what things predict blood levels, and there was talk about what we found in the soil samples we took. We took over 3,000 samples that were analyzed for dioxins. We'll talk about household dust dioxin levels. We will talk briefly about the results of our questionnaire, the prevalence of various factors, in other words, what proportion of the people eat fish from the Tittabawassee River, what proportion of people engage in fishing, what proportion of people are hunters, what proportion eat game from the Tittabawassee River, Saginaw River area and elsewhere in Michigan, recreational activities on the river, and

then our summary conclusions.

In addition to the material that we present on August 15th, we are going to post a large number of statistical analyses to our website on that same morning, on the morning of August 15th. Those will provide all of the statistical distributions of soil, dust and blood dioxin results, giving means, medians, 75th percentile, 95th percentile, maximum values, number of values below detection, and in women detection. Those will be given by cogener by region, as well as by TEF by region, and we'll also give box of whisker plots for those of you who like to get a sense for the distribution.

We will give all frequencies of responses to all the questionnaire items. So those of you who have gone to the trouble of downloading our questionnaire from the website, you're all free to do so, you can actually see how many people said they said yes to each question, how many people said that they were lifelong mediators, how many people said they hiked or picnicked along the Tittabawassee, et cetera. We believe that those data will have considerable value to the DEQ, MDCH, and also to the Dow Chemical Company as they try to move forward to assess the extent of exposure to contaminated materials in the environment.

The week after we present in Midland, my team will be traveling to the Dioxin 2006 Conference in Oslo where we will present about 30 papers giving in-depth results. All of those papers will be posted to our website shortly after we give those presentations on August 21st. We have a session on the 21st. Okay. And I should say we will have booklets -- this is our galley proof copy. It's a 44-page booklet. It will be a little bigger than this, giving all of the results. We will be handing these out at the meeting. We are having 7,500 of them printed. You're welcome to take a few and give them to your colleagues. They will summarize all of the results.

MR. CHUCK NELSON: Now we're at that portion of the meeting where we can ask questions of any of the presenters. If you would beg my indulgence, John, are you still here, because you were the first person who I had to cut off to keep things moving. John, do you want to ask your question right now? You were at the microphone first, and I'd like to get you up here. So if you can put your coffee down for a second, is that okay, and then we will get to everybody. John was here first, and I had to cut you off here, John. I apologize, but I wanted to keep things moving.

AUDIENCE MEMBER: John with MUCC, Lone Tree Council and Michigan Resource Stewards. This question is going to be asked to both DEQ, Jim, you may comment on it if you could, and I don't know if there's anybody from Dow that would like to respond to this. The question is, when will the analytical results from the cage fish studies be published? What fish are involved and so on? I'd like to get a complete update on that, if I may. Also, from what I understand, they're not going to consider what's coming down from Alma and St. Louis. Is that going to have any impact on those cage fish studies? Thank you.

MR. AL TAYLOR: Well, first with regard to the upstream potential sources of contamination, that is actually something that is going to be considered as we move through the remedial investigations. Obviously, there are sites on the Pine River. There's petroleum sites up on the Pine. Those have to be taken into consideration. There is contamination upstream of Dow Chemical in Midland, usually different contaminants from what we've been seeing so far, but there are some that are very similar, so we're going to have to portion those out. So that is part of the process that we're looking at. In fact, some of the GeoMorph people who were out on the river last Friday

when I was out doing some observation were actually looking upstream of Poseyville Road Bridge, in that area, trying to get kind of a background of concentrations, et cetera.

The caged fish study data that you're referring to, there are a number of cage fish studies that have occurred over time. I don't believe any of those are actually published on the website, but they are available that you can look at. Some of them are directly related to studies that were done adjacent -- directly adjacent to Dow Chemical because of potential releases from ground water venting into the river, and so there are at least two studies related to that. There are also studies that have been done in I think the 70's, 80's and 90's and in 2000 as well that are not up on the website, but we can get you copies of those so you can see what contaminants have been looked at. Obviously, dioxins and furans have been found in those. Hexachlorobenzene have been found in those. Octachlorostyrene is also a contaminant of concern there. There are some others depending on where the studies are, but those are available. I just don't think they're out in readily digestible format right now.

AUDIENCE MEMBER: Are the compounds that

you're looking for on fish on that information that you have?

MR. AL TAYLOR: One of the criteria for this PCOI list, or this list of other contaminants, is if it's been found in a biological specimen, like a caged fish study or like one of MSU animal studies, then it goes on the PCOI list, yes.

AUDIENCE MEMBER: Referring to Deb's presentation, the consideration for body burden -- total body burden and so on, I was glad to see that, and I think that's a very, very important health issue. Thank you.

MR. CHUCK NELSON: Ma'am.

AUDIENCE MEMBER: For Dr. Garabrant, was there any consideration given to using the Jackson, Calhoun area for mud levels that might have been contributed by other manufacturing concerns in that particular area so that, you know, there would be legitimate comparison?

DR. DAVID GARABRANT: Yes. We chose Jackson and Calhoun because it is demographically quite similar to Midland, Saginaw in terms of the percentage of population employed in manufacturing service industries and agriculture, as well as having the same ratio, sex and age distributions. We did not want to

compare Midland and Saginaw to an area of Michigan that had no manufacturing activity or no economic activity. We thought the appropriate comparison was to find an area similar to this but with no Dow Chemical Company, which would allow us to correctly assess Dow's contribution to pollution and to people's blood levels. If you took Midland and Saginaw and compared them to rural areas in the lower peninsula, it's an apple and orange comparison.

AUDIENCE MEMBER: Okay. Thank you.

MR. CHUCK NELSON: Sir.

AUDIENCE MEMBER: Leonard Heinzman from the Tittabawassee River Voice. I guess I got a question for Jim. In view of the NAS report, a lot of findings seem to be pretty dramatic in quite a few areas, and the fact that the MDEQ now is quoted and said they're going to be using the best science available in their review and we have a very scientific study coming up, the U of M study, of course, will you guys be using those two studies as a reassessment potential for reevaluating a trigger level of manufacturing employee now in our MDEQ levels that we use?

MR. JIM SYGO: To the extent that the NAS evaluation will have some type of impact on the methodologies that EPA uses to determine risk levels,

the answer would be, yes. We don't know at this point to what extent that will happen and what that will be. In terms of the U of M study, I think we've said all along that the study will be invaluable in providing key information to us to take a look at it from a prospective of different pathways. It may provide a great deal of insight. We're not as certain that it will allow us to specifically look at a soil number though, and again, until we see that information and it's not long that we're going to see it, again it's difficult to answer, but we will use that study in anyway that we can that's relevant in assessing any of the work that's going to be done as part of the corrective action work obligated to Dow.

AUDIENCE MEMBER: Because the U of M study is basically the bottom line to folks living in the floodplain. If a substance is there in an amount that's not hurting anybody, which hasn't been proved or disproved, that really is the bottom line in people's minds. We don't care if it's there if it's not hurting anybody, because there's a lot of things there that aren't hurting people.

MR. JIM SYGO: Well, we'll look at what it says.

MR. CHUCK NELSON: Michelle.

AUDIENCE MEMBER: I just wondered, in that first presentation that you folks did tonight, if you could just talk to us about the collaborative decision not to proceed with the bioavailability study in the floodplain.

MR. JIM SYGO: Well, where's Greg? Do you want to talk about that, too? I think what we ended up doing from the DEQ -- let me talk about the DEQ's perspective on it, and then Dow can add anything that they would like, but we looked at the pilot study that had been completed, along with the additional information that was provided, and I think we got all that information back in June, and we took a close look at that information, and what we tried to do is really, for particularly the Tittabawassee River, assess, well, what does it mean in terms of bioavailability. Is it going to increase the factor that we use in our algorithms? You know, we default at 50 percent, or is it going to decrease it? And if it was going to increase it or decrease it by this much, what would that mean? And when we tried to do that assessment, and also based on the information that was available from the pilot study, we really didn't see a substantial benefit that Dow was going to achieve if they were attempting to see how high a

number they could get above 90 utilizing that information.

So our conclusion was that conducting that bioavailability study was probably ill-advised and that using even the default value that the Department would normally use was probably germane still, but it's a decision that we looked at collaboratively.

AUDIENCE MEMBER: What's your default number? What is the Department's default number?

MR. JIM SYGO: 50 percent. It's kind of an algorithm value, a variable, and the conclusion we had is that it's possible that this money that would be set aside and used for a bioavailability study could be used to do work more quickly without having to, you know, draw -- as you recall the schedules, I think the schedule for the Tittabawassee River we were looking at another four-year period to complete a bioavailability study there I think. So that was kind of our take on it. We sat down with Dow to discuss it and EPA. EPA I believe concurs with our position, although they're not here tonight to say so, but Jerry Phillips and Greg Rutloff were both on the phone at that time, and we presented that to Dow, and Dow came back with a decision a subsequent day indicating that they appear to concur, but let me kick that to Greg or

whoever he wants to discuss their position on.

MR. GREG COCHRAN: First of all, I'm not going to speak to the technical aspects of that. We do have the experts here to address that, but Jim is exactly right. I mean, from our perspective, we looked at the study and the value that that study brings in bringing about an overall solution and then weighed that against the time frame that it's going to take to get that study, and I think the consensus was it's slowing things down. It's not going to help you to a better solution. Now if you need a better technical answer to that, I'll throw that to the technical experts, but overall, from an administrative viewpoint and a schedule viewpoint, which is critical, we said we could remove that piece and move faster.

AUDIENCE MEMBER: Thank you very much. Jim, one more question. Under the resolution of collection of key exposure assessments, it seems to be a bone of contention over whether or not Dow is going to be sampling the Priority 1s and the Priority 2 areas, and I see that they're going to wait and look at Dr. Garabrant's study in September. Can we anticipate after that point in time that Dow will be doing that sampling?

MR. JIM SYGO: Well, what we've asked

Dr. Garabrant's team to do, and we've provided him specific questions that were prepared by my staff and Dow's staff basically, and what we're looking for is how -- what he could provide us that would be beneficial to take a look at what the concentration levels are within the Priority 1 and Priority 2 properties without getting into his confidentiality issues. Now he's agreed to do that in a format where we won't know which properties it's on, but we'll have kind of a range of information, basically as I understand it, and we need to take a look at that, because one of the concerns we've had is that with the exposure controls that are going forward on the Priority 1 and now the Priority 2 properties is we anticipated that the levels were in the vicinity of 1,000 parts per trillion, and that might be somewhat lower now with the new TEFs basically, but the concern that we had is that if the concentrations were much higher on the residential properties in particular, there's a concern as to whether or not the types of exposure controls that were placed are sufficient or not.

So in order to determine that, we are interested in getting a representative sample or a cross section of information on the Priority 1 and Priority 2

properties to see, are these levels much higher than 1,000 or are they in the vicinity of what we thought they would be, or are they much, much higher, because I know people have seen that -- in some areas of the floodplain now, we've seen levels as high as I think, what, 20,000, Al, in some of the floodplain areas, and certainly 8,000 down by Imerman Park, and we just need to know, does this extend -- do those kind of levels extend to the Priority 1 and Priority 2 areas.

AUDIENCE MEMBER: So the sampling will take place after you get that information from Dr. Garabrant?

MR. JIM SYGO: Well, we need to look at that. The information that Dr. Garabrant provides may be enough information for us to make that determination. I think where we still need additional information is, as Al indicated, is certainly in the agricultural areas, and then if we don't have enough information on the Priority 1 and Priority 2s, we have a meeting scheduled in September to take a look at what other information we do need and where it needs to come from.

AUDIENCE MEMBER: And correct me if I'm wrong, one more question, I promise I'll sit down, is Dow not required under the Framework Agreement that

you folks signed, that Dow and DEQ signed, are they not required to test those Priority 1 and 2 properties under the Framework?

MR. JIM SYGO: Under the interim response requirements --

AUDIENCE MEMBER: In the framework.

MR. JIM SYGO: Which was an appendix to the framework, right, there is a clause in there that the properties may be tested. It doesn't say they will test them at that point, and you need to remember that at that point our primary interest was exposure controls, and there were some presumptions that were placed in front of everybody to deal with those exposure controls, so that the further -- the remedial plan for further evaluation was going to deal with a collection of that data. Clearly, once GeoMorph moves downstream, that information will be available for all those properties, but we're kind of concerned from an exposure control basis again that we have some preliminary information right now to make sure that those exposure controls that were placed are sufficient.

MR. JOHN MUSSER: I don't disagree with anything Jim said, but I think it's also important -- and if any of our technical people want to chime in

here, that's fine, but it's also important to consider from the Dr. Garabrant and his team's effort what those study results say with respect to exposure, because if we find, for example, 8,000 ppt in some of the work on a Priority 1 property, if we're able to determine something about exposure, which I think we will from the U of M study, that says perhaps there is not a high degree of exposure, that should weigh in on whether there's a need for additional sampling or not on any of those properties. So that's another factor to consider when we look at the U of M study results. That's my only point.

MR. CHUCK NELSON: Ma'am.

AUDIENCE MEMBER: Dr. Garabrant, would you once again explain that your study is not a health study and it's not going to tell us whether or not anyone has been harmed by dioxin in the floodplain.

DR. DAVID GARABRANT: Our study is not a health effect study in assessment of health effects. It is a study of exposure pathways to try to identify whether dioxins in the soils and sediments and house dust get into people's blood, and if so, by what pathways, through what happens through what they eat, et cetera.

MR. CHUCK NELSON: Go ahead, John.

AUDIENCE MEMBER: Thank you. Al, one thing I didn't get is when the final results of those cage fish studies would be published?

MR. AL TAYLOR: Well, I don't think there's a plan right now to publish them as a comprehensive document. They all exist in separate studies that have been done, but one of the things that I wrote down and took away is see if we can get those up on the website in some way that people can easily access them.

MR. CHUCK NELSON: Go ahead, ma'am.

AUDIENCE MEMBER: Dr. Garabrant, a question for you. I'd like to ask why you are releasing the results of the study to the media ahead of the public, the stakeholders and most importantly the study participants? I understand that there's a 9:00 meeting August 15th with the media.

DR. DAVID GARABRANT: Yes. There is a media briefing at 9:00 a.m., and then there will be a briefing of stakeholders at 1:00 p.m., and then we will announce the results to the public at 6:00 p.m. The reason for that is as follows. We have every desire to make sure that the media get their stories straight, and it takes time to write stories, and so I think it's appropriate to sit down with them in the

morning and say, okay, here are the results. We know that for most of those media the major presentation is the evening news, which will be at about the same time as our public announcements. So that will allow the media five or six or seven hours to get their stories written.

Briefing the stakeholders at 1:00 will allow them a few hours to think about what the study results mean. Some of those stakeholders, like elected representatives and representatives of the Michigan State Government, may be asked for responses. I think it's courteous on our part to give them a few hours to think about how they're going to respond to what our study has to say.

AUDIENCE MEMBER: Would the stakeholders, does that also include the participants in your study at that 1:00 meeting?

DR. DAVID GARABRANT: No. The stakeholders include elected representatives, County Commissioners, City Managers, State Representatives, Federal Congressmen, include MDEQ, MDCH, includes the Dow Chemical Company, includes County Health Officers, and includes representatives from the environmental groups. These are in my words people who represent groups in this city or in these two counties and who

have some responsibility to the people they represent.

AUDIENCE MEMBER: But the participants that were involved with your study, I feel it's totally unfair for the media group and then your 1:00 meeting with your other individuals, that I feel that what's going to go into the media is only going to be one-sided when they give the report at 6:00 p.m. You are not going to be -- we as stakeholders, as far as people who live on the floodplain, since it is a public meeting, at 6:00, we will not have an opportunity to give our thoughts in regards to the results. So I think you're very one-sided at the 6:00 news when they will put the reports on.

DR. DAVID GARABRANT: Well, first off, let me express our sincere gratitude to all of the people who participated in our study. We have had an outstanding participation by the people of Midland and Saginaw, and my entire team is immensely grateful for the good will and the willingness on their part to participate in the study. It was a lot of work, and I don't mean to discount that in anyway. We're really grateful for that.

In terms of the press, I trust the press. I trust the press. Particularly, the Saginaw News and Midland Daily News have worked hard to provide a

balanced view. I don't claim they got everything right, but I think they've worked hard. I've worked with the reporters from those papers fairly closely. They try hard to get their facts straight. I want to give them enough time to understand what it is we're telling them, and it's not with any disrespect to the participants in the study. I want our study participants to come at 6:00, but I want to be sure that the people that write stories have a few hours to work on it.

AUDIENCE MEMBER: I was just going to mention that the study results will be on the website early in the morning, so participants can look at that website.

DR. DAVID GARABRANT: We will post the results to the website in the morning, so that anyone can log on to the website and get the results.

AUDIENCE MEMBER: What is the website?

DR. DAVID GARABRANT: Www.umdioxin.org.

AUDIENCE MEMBER: Will the Saginaw News and Midland News place that information in the newspaper so that individuals that are not here tonight that have participated with the study are able to go to that site prior to that 6:00 meeting?

DR. DAVID GARABRANT: I am certainly hoping

that the newspapers will publish that. We have sent out notifications to all the media regarding the announcement on August 15, and I'm hoping that they will list our website as well. I don't control the newspapers.

AUDIENCE MEMBER: Where at SVSU, which building?

AUDIENCE MEMBER: Curtis Hall Performance center.

DR. DAVID GARABRANT: And there will be big signs. You can't miss it.

MR. CHUCK NELSON: Are there other questions or comments for us tonight?

AUDIENCE MEMBER: Mr. Musser, you mentioned that there were alternatives to dredging. Would you elaborate in terms of potential cleanup?

MR. JOHN MUSSER: I'm going to ask as well that maybe some of our experts, like ATS, maybe speak to their experience in these matters where they've used various methods for remediating, which includes what they call natural attenuation, which is allowing the habitat to return to its natural state, which could in effect reduce erosional situations, try to improve on those, and further stabilize I suppose any depositional areas. There's also -- we mentioned

dredging. That's a possibility for some areas. That may be the right answer in some places. We'll have to wait and see. There are other things I think that you can do as well in terms of putting caps. You can cover it with soil or with clay. Those are options. I mean, I don't profess to know all the various options, but those are a few. I don't know if you want to make comment on some of the options that have been used in other situations, Peter.

MR. PETER SIMON: I think John did a pretty good job generally summarizing the range of options. There's a variety of options, and again, it goes back to understanding the dynamics at play. If, as an example, you have a deposit that's been there and is stable and you have material that's created over the top of that deposit for many, many years, maybe it's buried six, seven, eight, nine feet underground, and you have clean material on top, going in there and removing that and destroying the habitat in that area, based on the ecological factors, may not be the best solution. So you have to understand how it got there, why it got there, the relative stability of it being there before you can come up with a general remedy or a corrective action. So there's not a single corrective action that's applicable for every solution

or situation I guess.

AUDIENCE MEMBER: But you will have the best realtime knowledge of the first 6 miles now or shortly, the end of this summer?

MR. PETER SIMON: Yeah. We're using a realtime analytic process to help us innervate our way through the characterization, absolutely.

AUDIENCE MEMBER: And am I to understand that next summer you'll do the next 16 miles of the Tittabawassee?

MR. PETER SIMON: This has been approved as a pilot program. So what the schedule is for next year will ultimately be dictated by the success of our program this year.

AUDIENCE MEMBER: So you don't know at this point whether you're even going to be doing the same GeoMorph work for the next 16 miles?

MR. AL TAYLOR: Do you mind if I weigh in here?

AUDIENCE MEMBER: Certainly.

MR. AL TAYLOR: I think you just touched on a real important point, and I think it got lost when I was giving my presentation, and I apologize for that because I was relying on so much on what you said. The pilot portion of this is very important, and I

think it may have resulted in some confusion earlier in Jim's response to your question. As part of this pilot process, we're looking at making sure that this GeoMorph characterization does a good job of characterizing the distribution of contaminants in the watershed but -- and we discussed this in meetings with Dow last week and earlier -- as part of this pilot process, it is at least a technical expectation that we'll be looking at opportunities for interim response activities, you know, even over the next couple of months and maybe trying some different interim response activities out to see what works well and what doesn't work well under the Tittabawassee River conditions out there.

Because you're right, we've got another 16 miles to go starting next year, assuming that this does a good job of characterization, and we think it probably will, but we need to begin to develop information now to determine, okay, what works well in terms of stabilizing. For example, if we find highly contaminated banks that are eroding, we need to figure out technologies that work in a timely manner, because we have a lot more work starting next year. So there is going to be need to do some of that work this year I believe.

AUDIENCE MEMBER: Well, that is much more hopeful. That is what I got out of the last meeting, that some of those interim responses would at least be tried at this point when you have some knowledge of this ecosystem.

MR. AL TAYLOR: The way we're looking at it, and Dow may disagree at this point, but the way on a technical level that DEQ are looking at it is we got to try some of these things. We also got to be very careful monitoring as we do these things. Stabilize a bank or dig something up, it's going to have an effect in the river further downstream, and you got understand what those effects are, and a lot of times, you know, we'd like to say we know exactly what's going to happen, but we're going to have to try some stuff and actually measure it and see what happens, and I think that's some of the stuff we're going to be looking at later this year.

AUDIENCE MEMBER: Okay. Well, is Dow cooperative with this effort? I mean, are you supportive, Mr. Musser, with this effort to try out some techniques at least during the interim?

MR. JOHN MUSSER: Conceptually, yes. We haven't got to the detail part of it, and sometimes we don't know all the details, as we all know, but we're

going to be trying to work toward that end to find the right dimension of how to approach situations as we identified in the long run in those technologies.

MR. CHUCK NELSON: We are at 8:55 now. So what I would like to remind you is that the next meeting will be on Wednesday, November the 8th, at 6:30 in this room. We do not know what the agenda is. If you have additional agenda items, let Cheryl know, because she does a great job with keeping track of all those ideas and things. The folks from Dow, the Department of Community Health, Dow's contractors, the DEQ, hopefully Dr. Garabrant, will be around here for a few minutes where you can talk with them individually. Thank you for coming tonight.

(Deposition concluded at 9:00 p.m.)

STATE OF MICHIGAN)
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COUNTY OF SAGINAW)

I certify that this transcript, consisting of 103 pages, is a complete, true, and correct transcript of the proceedings and testimony taken in this case on August 9, 2006.

I also certify that I am not a relative or employee of or an attorney for a party; or a relative or employee of an attorney for a party; or financially interested in the action.

August 18, 2006

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Natalie A. Gilbert, CSR-4607, RPR
Notary Public, Saginaw County, MI
My Commission Expires: 8-10-16